



## Section 3: PVA Workshop Minutes, March 4, 1997



## **Report on PVA Meeting at Redwood Sciences Lab, Arcata CA**

*March 4 1997*

These notes are provided as a record of the meeting. They were prepared by Steven Courtney, Ph.D, of SEI. Comments or queries on the notes should be addressed to him at 503-241-0225 or email him. The meeting was also videotaped so that the discussion could be recorded.

### **Introduction**

*Steven Courtney*

The purpose of the meeting was to discuss the ongoing PVA process, and to provide some information to Resit Akcakaya, PhD, of Applied Biomathematics, who will be performing the quantitative analyses. Dr. Akcakaya will, in the next three weeks, be developing a series of models, to address the importance of different factors on the survival of Mm-relet populations. One of the goals of this analysis is to provide a sensitivity analysis that shows the relative importance of different factors.

Akcakaya will be carrying out quantitative modeling. At the same time, Courtney will be researching some of the parameter values, to determine which values are most realistic. Courtney's report, which will be based on the models, will state, as far as possible, the probable outcome of alternative management scenarios.

Parallel to this process, Sherri Miller and CJ Ralph, D.Sc. both of Redwoods Science Laboratory, Pacific Southwest research Station, US Forest Service ("RSL") will be carrying out habitat analyses of Pacific Lumber and other lands. The goal of this analysis is to determine the amount of habitat, and the relative density of Murrelets in different areas. A major goal of the meeting and workshop was to get advice. The modellers want to make their analyses useful to the decision-makers. The group was urged to state all reasonable parameter values. The stated process was to achieve group consensus where possible, and where this was not possible, to state the range of opinion. Akcakaya's models will then address the effects of these differing assumptions. The group was however advisory - ultimately the modelers are responsible for developing appropriate models.

Courtney also acknowledged the limits to modeling approaches, and discussed the need to present quantitative analyses in a framework that makes clear how these models are most appropriately used.

### **Habitat Analysis**

*Sherri Miller, C Ralph*

Miller and Ralph outlined the procedure to be used in the data acquisition phase of the habitat analysis. These data will go through a verification

process in the next few weeks. Additional fieldwork will be carried out to improve coverage of both habitat and of Murrelet survey information. The habitat analysis will include study of the amount of habitat in different areas (existing or proposed reserves; proposed harvest areas). The analysis will also provide potential 'weightings' for these areas on the basis of numerous factors including observed Murrelet occupancy or detections, fragmentation, distance to shore etc. Ultimately the goal of the analysis is to provide an estimate of the proportion of the local population that will be protected under the proposed land transfer.

## **Models**

*Resit Akcakaya*

Akcakaya outlined the models that will be developed using RAMAS software and a stage-matrix approach (see appended figures). These models will provide estimates of the probability of extinction of Murrelet populations at different scales and under different assumptions.

## **Initial discussion**

It was emphasized that these analyses need to be useful to decision-makers, both within the regulatory agencies, and the Pacific Lumber Company. In the Habitat Conservation Plan negotiations, slated for April 1997, interested parties will need information on the probable impacts of alternative management options. This information will also be essential for any later implementation of an agreement. These needs should drive the format of the analyses, so that results address questions of importance. Even if the resolving power of the PVA is unable to distinguish the effects of some of the alternative proposals, it will provide the best available scientific information on the topic.

It was suggested that the PVA group seek additional data and opinion from other scientists not at the meeting.

Populations and carrying capacities A lengthy discussion focused on the appropriate scales for the initial and subsequent models. We decided that biological populations were more appropriate for study than arbitrary populations set by state boundaries. The initial proposed series of three models was expanded to include a fourth level. The final series is:

Listed region ---Metapopulation model with 5 populations

(WA, Northern Oregon, Recovery Zones 4, 5,6)

'California' --- Metapopulation model with 3 populations

(Recovery Zones 4,5,6; includes part of Southern Oregon)

Recovery Zone 4--- Metapopulation model with 3 populations

(southern OR, del Norte and northern Humboldt Co, Bioregion)

Bioregion --- Single population

(Pacific Lumber and Humoldt Redwoods State Park habitat)

The Recovery Zone 4 model will be studied first, including the proposed Headwaters reserve. Representatives of CA Dept of Fish and Game, and US Fish and Wildlife Service identifies this as the preferred initial modeling step.

Zone 4 populations were stated to be in the following ranges:

Southern Oregon	1,200 Murrelets
Del Norte and Northern Humboldt	3,600 - 4,000 +/- 15%
Bioregion	1,300 - 1,700 +/- 15%

Population levels for the later metapopulation models were set at:

	Low estimate	High estimate
WA	5500	<b>5500</b>
OR	5400	10800
so.OR	1200	1200
NoHumb	3600	4000
Bioregion	1300	1700
Zone 5	200	<b>300</b>
Zone 6	700	900

Carrying Capacities (K) will be modeled under three assumptions:

- Population is currently at carrying capacity
- Population is currently 2% beyond carrying capacity of habitat
- Population is currently 25% below carrying capacity

Different model functions will be used to consider e.g. density dependence under these scenarios. All alternatives (population at, below, or above K) were thought to be consistent with available data.

### Extinction Threshold

For modeling purposes it is important to set a value below which the population is judged extinct. This is both biologically reasonable (at very low densities birds may not find mates, etc) and necessary to avoid unreasonable results (e.g. where a population with 0.5 of a bird persists). A percentage figure was proposed.

### Logging

The essential data here will eventually be provided by the Habitat Analysis carried out by RSL staff, and by survey data from 1997. In the interim the following range of figures was suggested:

Amount of habitat in:

	Acres
Current Reserves	2,000 to 7,000 to 22,000
Proposed New Resources	500 to 3,177
Harvest areas	2,500 to 3,800

It is expected that the amount of acreage in different areas will prove to be an important determinant of model outcome. The habitat analysis will determine which of these figures is most accurate. Mm-relet surveys, and habitat characterization studies in 1997 will greatly increase the accuracy of this part of the analysis.

.Currently 6,648 acres of old-growth on Pacific Lumber lands are thought to be occupied by Mm-relets. It is possible that some residual stands are also occupied habitat.

.The effect of staggered harvest will be incorporated into all models. All harvest will be assumed completed by 15 years

### **Cumulative Impact**

It was felt that there will be relatively little additional impact on Mm-relet populations in Zone 4 due to timber harvest. The Arcata Redwood HCP may have a small impact. Most of the other Murrelets in this Zone are supported on federal lands, which are unlikely to be harvested. An estimate a 5% decline as a result of other impacts was thought adequate to compare to the 0% scenario.

USFWS staff will attempt to estimate probable impacts outside of Zone 4, for the later modeling processes.

### **Time Horizon**

A 50 year time horizon was agreed upon for all models. This represents the period identified by the Recovery Team as the most dangerous for the species, before forest succession can provide new habitat.

### **Dispersal**

It was suggested that no adult dispersal be allowed in the models, and that 10% of juveniles and subadults should disperse to adjoining regions. This would be compared to a no-dispersal model.

### **Correlation**

Marine or weather factors may result in geographically separate populations experiencing similar conditions. Hence breeding success or

survival in one area may be correlated with the same parameter elsewhere. Two values for correlation were selected : 1 .0 (complete correlation) 0.2 (weak correlation)

### **Periodicity**

We decided to include this in later models but not the initial run. It was felt that periodicity will be reflected in variance in vital rates, and hence will be adequately covered in initial models.

### **Catastrophes**

We decided that the probability of large-scale fires eliminating existing or proposed reserves was too small to adequately address in a quantitative model that considers the next 50 years. Such catastrophes may however be addressed by regulatory agencies or others evaluating very long-term risks to the population.

.Oil spills that affect a significant portion of the population were thought to be more likely. An initial estimate was suggested of 1% annual probability of a spill that kills 50% of the population. This figure will be revised in future models, on the basis of data from spill management agencies etc.

### **Variance in Vital rates**

Two scenarios are suggested: high or low variance.

Coefficient of variance:	High	<b>LOW</b>
survival	10%	3%
Fecundity	50%	20%

Offshore counts from RSL data may aid in determining the variance in the local population.

### **The Ongoing Process**

Following this workshop there will be an intensive period of analysis. Before early April, Akcakaya will develop the first of four models, including a sensitivity analysis. Courtney will prepare a companion document that outlines available information on the assumptions and parameters used, so that decision-makers can determine which assumptions are most realistic. The RSL team will be engaged in acquiring and verifying habitat data. These reports will be available prior to the beginning of the HCP negotiation process. As more models are developed, fieldwork proceeds, and more analysis is completed, additional reports will be completed in early to mid summer.

Data and analyses will be made available as they are completed. The website for the project will be online any day (and can be accessed through [www.sei.org](http://www.sei.org)). Outside review will be solicited as the process

continues.

**Attendees**

Akcakaya <b>R</b>	Applied Biomathematics
Alden H	Pacific Lumber
Bacik F	Pacific Lumber
<b>Burkett</b> E	CA Fish and Game
Carroll P	US Fish and Wildlife
Chinnici S	Pacific Lumber
Corbett M	US Fish and Wildlife
Courtney S	SEI
Detrich P	US Fish and Wildlife
Engel K	Foster Wheeler
Gaither J	CA Resources Agency
Henson P	US Fish and Wildlife
Koch T	US Fish and Wildlife
Mackay D	US Fish and Wildlife
Miller S	US Forest Service
Moore K	CA Fish and Game
Ralph CJ	US Forest Service
Reid T	CA Resources <b>Agency</b>
Roberts L	US Fish and Wildlife
Stauffer H	Humboldt State Univ
StopherM	CA Fish and Game